

AD-A050 258

ARMY RESEARCH INST OF ENVIRONMENTAL MEDICINE NATICK MASS
THE CARDIAC EXERCISE TECHNICIAN - A LACROSSE WORKSHOP, (U)
SEP 77 O D HOTTENSTEIN

F/6 5/9

UNCLASSIFIED

USARIEM-M-1/78

NL

1 OF 1
AD
A050258



END
DATE
FILMED
3 -78
DDC

AD No. _____
DDC FILE COPY

AD A 050258

①
54

THE CARDIAC EXERCISE TECHNICIAN

- a La Crosse Workshop

*See 1473
in back*

OMAR D. HOTTENSTEIN

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

DDC
RECEIVED
FEB 21 1978
B

(ABSTRACT)

△ In recent years, the rate of expansion in the field of exercise evaluation and physical fitness training has prompted governmental, professional, educational, and private institutions to develop educational programs, professional standards, and co-operation among the various disciplines involved in stress testing, cardiac rehabilitation, and adult fitness. Cardiac Exercise Technicians have become important personnel in many aspects of preventive, rehabilitative and maintenance fitness programs. Beyond their normal responsibilities and roles during graded exercise test administration, they may also serve as efficient, competent assistants for exercise sessions and emergency procedures.

This article is a presentation of the background organization, and a description of one such educational program: the Cardiac Exercise Technician Workshop of the LaCrosse Exercise Program, University of Wisconsin-LaCrosse. Included are considerations of specific interest to exercise technicians and those involved in graded exercise testing and training. ★

NTIS	Write Section	<input checked="" type="checkbox"/>
DDC	DDT Section	<input type="checkbox"/>
UNANNOUNCED		<input type="checkbox"/>
JUSTIFICATION		
BY		
DISTRIBUTION/AVAILABILITY CODES		
Dist.	AVAIL	and/or SPECIAL
A		

INTRODUCTION

Cardiac rehabilitation, as a therapeutic and management process for patients with coronary heart disease (1) has been concerned with those factors necessary to promote the patient's sense of well-being.¹ Today these include the social and mental aspects, as well as physical and occupational considerations. Until now, Cardiac Exercise Technicians (CET) have usually been involved as para-professionals for diagnostic, graded exercise tests in clinical settings. With the growth of rehabilitation programs, new opportunities have developed for competent Exercise Technicians in rehabilitation and allied health programs.

The American public has shown an increased awareness of its own health and well-being. With the growing popularity of jogging, numerous articles in weekly newsmagazines have covered this concern for physical fitness. Community and industrial groups have joined personal efforts directed towards prevention, rehabilitation, and maintenance programs of cardio-respiratory fitness. These developments have not come about without controversy. Concern for the safety, supervision, and efficacy of these programs was recently reported in this journal.² These issues are important to Exercise Technicians if they are to remain, or to become involved as responsible and key members of such programs.

Fitness programs, however, are not the sole area of

controversy in need of clarification through standardization and research. Professional concern has also been expressed about the state of the art of stress testing. Herman K. Hellerstein, M.D., of Case Western Reserve School of Medicine in Cleveland, Ohio, has suggested that most tests are not being conducted properly.³ Jan J. Kellerman, M.D., of the Cardiac Evaluation and Rehabilitation Institute and the Chaim Shebe Medical Centre, Tel Hashomer, Israel, wrote in a 1975 review article on cardiac rehabilitation and its problems:

To date, no standardized methodology has been implemented, despite the numerous undertakings and great efforts towards the preparation of an international standard.⁴

In spite of, or, perhaps, because of this pessimism, educational programs continue to be initiated for personnel in rehabilitation and physical conditioning situations. As a result, new communication and valuable literature are available dealing with procedures and methodologies as well as the psychological and physiological aspects of stress testing.^{5,6}

In this presentation, a brief background of some of the available programs offering educational experience is given. An in-depth discussion of the organization of the Cardiac Exercise Technician Workshop of the LaCrosse Exercise Program

University of Wisconsin-La Crosse is presented with reference to procedures in graded exercise testing (GXT) and schedules of rehabilitation and fitness. This active educational program provides learning opportunities for all personnel presently involved in cardiovascular fitness programs, and training for those interested in establishing similar programs. Pertinent details of the workshop will be followed by important concerns for Exercise Technicians.

ORGANIZING EXERCISE AND HEALTH

Today, professional and governmental organizations are being joined by private, university and industrial institutions to develop guidelines and continuing education programs, as well as to promote research in exercise, fitness, and cardiac rehabilitation. These organizations include the International Society of Cardiology and World Health Organization, the American Medical Association, the American College of Cardiology, the American College of Chest Physicians, and the American College of Physicians.⁷ Such groups are actively involved in medical education, standards, and the treatment of heart disease, as well as the improvement of communication among all concerned parties. The President's Council on Physical Fitness and Sports has as its task the development and co-ordination of a national program of physical fitness and sports. Involved in the co-sponsorship of research grants, it disseminates information to individuals, business, industry, and the schools of our nation. The Committee of Exercise of the American Heart Association has provided physicians with handbooks for the testing and training of people considered in good health,⁸ and, more recently, for high risk and cardiac patients.⁹

The American College of Sports Medicine is a professional, inter-disciplinary organization devoted to research, education, and co-operation among individuals concerned about health,

sports, physical education, and recreation. Their Guidelines for Graded Exercise Testing and Exercise Prescription¹⁰ is a significant contribution in developing specific standards and objectives for stress testing procedures and conditioning exercise programs. The guidelines describe how to establish an exercise program for healthy individuals, outlining the roles of the various personnel involved in the administration, including physicians, program directors, exercise leaders, and exercise technicians. The private sector of business and industry is increasing its executive and employee involvement in programs promoting physical fitness and health. Insurance firms and other corporations seek qualified personnel for these programs, and invest large sums of money in training and facilities. One company has independently developed an audio-visual learning system widely used for education and guidance in the field of coronary heart disease.¹¹ Even private community organizations have established national physical fitness and cardiovascular programs. The YMCA conducts workshops for its physical fitness specialists with certification examinations.

LA CROSSE EXERCISE PROGRAM

In June, 1971, a cardiac rehabilitation program was established at the School of Health, Physical Education and Recreation at the University of Wisconsin-LaCrosse, through the design and co-operation of the area medical profession with the university. This joint sponsorship developed an exercise program to offer physician supervision of patients with CHD or considered very prone to CHD. Referral by the primary care physician is necessary for an individual to enter the program.

The LaCrosse Exercise Program is governed by an Executive Board with members drawn from local hospitals and clinics, the University of Wisconsin, and the Wisconsin Heart Association. The Medical Director is Joseph W. Edgett, M.D., and the Executive Director is Philip K. Wilson, Ed.D. Growth of the program has resulted in expansion to five distinct units: Cardiac Rehabilitation; Adult Fitness; Research; Industrial Fitness; and Workshops. All are dedicated to professional education and research opportunities, offering assistance and expertise in health and physical fitness programs. As a functioning model program, they aid physicians, physical educators, physiologists, and allied health personnel in designing community programs. Attention to the learning, developing, and regulating aspects of this field will promote greater teamwork and enhance future effectiveness.

EXERCISE TECHNICIAN WORKSHOP

The Cardiac Exercise Technician Workshops have as their purpose the development of specialists in the area of exercise testing, cardiac rehabilitation, and adult fitness. Specifically designed for medical and allied health personnel, workshops are a beginning towards filling the current educational void in technician training in GXT procedures and standards. Completion of such workshops may prepare one for certification as an Exercise Technician through the American College of Sports Medicine.

The workshops are conducted each summer over a two week period, and offer over one hundred hours of instruction, practical experience, and critical evaluations. In depth study of the procedures and techniques for Cardiac Exercise Technicians is provided along with discussion of the concepts and theories involved. Emphasis is placed on the skills and knowledge needed in GXT for patients of diagnosed CHD or who are of high CHD risk. Throughout the workshop, participants are exposed to many of the idiosyncracies of establishing and operating programs of exercise for cardiac intervention, rehabilitation, and maintenance. Figure 1 is an outline of the LaCrosse Exercise Program which provides the staff and facilities for the workshops, and serves as a model for participants. Differing needs and resources may account for variation in the form and content of such programs in other parts of the country (Figure 2).

Participants are exposed to an intensive program of didactic

and practical laboratory experiences needed by today's exercise technicians. Throughout the workshops, participants are encouraged to observe and interact with the patient programs. In the final week, workshop participants directly administer, with supervision, functional GXT evaluations on healthy members of the Adult Fitness Unit for new exercise prescriptions.

Half of the workshop consists of lectures given by area physicians, university faculty and personnel, and physiologists. Among the extensive disciplines studied were: anatomy; cardio-vascular and pulmonary physiology; exercise physiology; cardio-pulmonary resuscitation; patho-physiology and epidemiology of CHD; risk factors and intervention; effects of medication; and the benefits, contra-indications, and precautions to be taken with exercising healthy and unhealthy adults. Journal articles and a comprehensive notebook provided for the workshop supplemented the lecture notes and readings in the textbooks.^{7,10} Review and discussions were held during evening mini-sessions with reference and audio-visual training aides readily available. Lectures covering the analysis and interpretation of electrocardiography (ECG) provided students with techniques and applications for practice in the laboratory setting. Case studies were presented and electrocardiograms evaluated. The measurements and calculations taught included physiological evaluation for oxygen consumption, metabolic equivalents, ventilation, cardiac output, rate pressure and triple products, energy expenditure, functional capacity, and exercise prescription heart rates. Two lectures covered

radiography, coronary angiography and surgical management of CHD. Topics such as the history, methods, and procedures of GXT prompted easy sharing of ideas among both participants and staff. Administration and financial considerations with, of course, insurance coverage comprised the legal and budget aspects in planning and operation of exercise programs. Actual design and proposals for industrial, community and private programs used in these discussions resulted in helpful exchanges concerning programs across the country.

GRADED EXERCISE TESTING

Intensive laboratory practice followed the lectures and demonstration of GXT. Using a team teaching approach, proper procedures and different methodologies were taught at ten separate stress testing stations with the following protocols:

- | | |
|-------------------------|-------------------------------|
| Bicycle Ergometer Tests | 1. Astrand |
| | 2. YMCA |
| Treadmill Tests | 3. Balke Substandard |
| | 4. Balke Standard |
| | 5. Bruce |
| | (with Sheffield modification) |
| | 6. Edgett Diagnostic |
| | 7. Ellestad |
| | 8. Kattus |
| | 9. Naughton |
| | 10. Wilson Functional |
| | (Beginning and Advanced) |

Participants used ECG instrumentation and other GXT equipment which varied in manufacture and sophistication. Working in groups of four, the students daily rotated through different stress system arrangements with the assistance and supervision of station leaders and the staff of the university. With one team member serving as the patient/subject, the other three had specific tasks to perform as the technicians during GXT practice sessions. Technician I administered the GXT with responsibility for patient contact and education, electrode placement, time, and co-ordination for proper recording of the procedure. Technician II insured completion of consent and evaluation forms, took pulse and blood pressure, and provided

assistance to the patient during the exercise. Technician III monitored the subject's ECG, operated the electrocardiograph, determined heart rates rapidly, and charted the ECG record. Rotation of the roles at each station provided each member with an opportunity to learn every task and procedure under different situations and with different equipment (Figure 3). Exercise Technicians may be called upon to perform several or all of these tasks, depending on their own working environments and the availability of personnel. Useful information on stress testing has been published in an article in this year's May/June issue of CVP.^{1,2} Another important reference text for these procedures can be found in Dr. Myrvin H. Ellestad's address on the principles and practice of stress tests.⁶ Therefore, coverage of the material presented and the performance demanded at the workshop will not be itemized.

EQUIPMENT AND MATERIALS:

An important task for the exercise technician is the set up, calibration, and operation of GXT equipment. Equipment of varying sophistication is presently available from a growing number of manufacturers. It is the responsibility of the exercise technician to be versatile; to become competent with the newer devices in order to evaluate the changing array of "standard" GXT instrumentation and materials.

The La Crosse Workshop offers a great opportunity to appraise and use the equipment of over sixteen manufacturers who co-operate with the La Crosse Exercise Program. Stress tests are conducted with a wide range of paper and electrode supplies and lead system configurations. Resources of the Human Performance Laboratory at the University of Wisconsin-La Crosse used during the workshops include:

Electrocardiographs:

- 1,2, and 3 channel systems
- Direct , thermal and ink writing recorders
- Automated and/or manual systems
- Bi-polar to 12 lead systems
- Computed heart rate, ST segment, ST integral
- Memory capability

Monitoring Oscilloscopes:

- Single and multiple channels
- Non-fade, digital and trend displays

Blood Pressure Apparatus:

- Manual and automated
- Anaeroid and mercurial sphygmomanometers

Treadmills and Bicycle Ergometers

- Manual and integrated work programmers

Respiratory Equipment:

- Automated ventilation/oxygen consumption
- Spirometry

EVALUATION/CERTIFICATION

During the second week of the workshop, three examinations were given to assess each participant's knowledge and skills. An optional fourth examination was available for those seeking certification in cardiopulmonary resuscitation. Each student was given his scores, class standing and a certificate of attendance. The objective examination covered anatomy, cardiovascular and exercise physiology, measurements and calculations, CHD and risk factors, GXT procedures, and patient education. Another two hour examination on the principles of ECG was followed by analysis of electrocardiograms for rhythm, ischemia, and conduction disturbances. The third examination was the laboratory practical, given to assess each student's ability to accurately perform GXT procedures (Figure 4). The behavioral objectives for Exercise Technicians as outlined by the American College of Sports Medicine were the criteria for evaluation.¹⁰ In co-operation with the American and Wisconsin Heart Associations, optional certification could be obtained in CPR by taking an objective examination of Basic Life Support accompanied by practical examination with recording manikins to quantify one's ability to perform these emergency procedures.

Satisfactory completion of the examinations, including CPR, are prerequisites for the Exercise Technician (A.C.S.M.) Certification.¹⁰ High standards of performance are set by the American College of Sports Medicine, and not all applications are approved. While the CET workshop has basic prerequisites for attendees, which are helpful and necessary, the examinations

clearly cover a broader spectrum. Prior experience, knowledge, and understanding of the field are useful for the exams. Through them, students from varying backgrounds and abilities may assess their comparative levels of competency and learn of areas for self improvement.

CARDIAC REHABILITATION

Lectures, tours, discussions, and clinical experiences expose workshop participants to all aspects of the cardiac rehabilitation program serving the La Crosse community. As part of Figure 5, cardiac rehabilitation is a progressive process, with several phases. For documented cardiac, post myocardial infarction, and post surgical patients, rehabilitation starts in the hospital by educating the patient and his family. Patients are informed of physiology, anatomy, CHD and risk factors, diet modification, and locally available programs. A mild conditioning process, individualized to the patient, starts a gradual program of rehabilitation by the patient's physician. Phase I retards the deconditioning begun in the hospital, and prepares the patient for home and out-patient recovery during Phase II.

Prior to discharge a submaximal GXT and ambulatory monitoring may be given to establish an exercising prescription heart rate for the patient. An eight week period of walking, or cycling on an ergometer comprises Phase II. This may take place at home or in an outpatient facility. The patient reports his activities and pulse rates on a log for his personal physician. Commonly included in Phase II are individuals highly prone to CHD, symptomatic and nonsymptomatic.

At the end of the second phase and its physical evaluation for maximal, symptom limited GXT, a patient's physician may give specific recommendations concerning work and other

activities. In many cases a new exercise prescription and referral to a supervised, vigorous exercise program are recommended.

Since 1971 the La Crosse Cardiac Rehabilitation Program has operated as one such physician supervised exercise program for documented CHD (specifically myocardial infarct and surgical patients), and those at high CHD risk. The referral of the primary physician is necessary throughout the program. Initial screening involves an informed consent and thorough case history followed by extensive laboratory evaluation. Resting, 12-lead electrocardiogram, pulmonary function, and blood analysis are combined with GXT including measurements of ventilation, oxygen consumption, and blood lactic acid. Anthropometric and related assessments are performed. An exercise prescription is determined which informs each patient of his maximum allowable heart rate for exercise. He is also taught how to take his own wrist and neck pulses. All information is reported on data sheets to the individual's physician.

Following the instructions of exercise leaders and technicians, patients start a six month "beginning" program consisting of walking and/or swimming exercises in the presence of a physician. Each exercise session commences with initial pulse and weight recording. Warm-up exercises precede the exercise periods. Periodically, during and after the exercise, pulse rates are reported to the Exercise Technician. Cool down

exercises and a period of pulse recordings complete each session. Appropriate shower precautions and supervision are maintained. Patients are encouraged to "pace" themselves and report their feelings to the staff. All personnel are trained and familiar with emergency procedure protocols for each area.

Laboratory evaluation are repeated every three months with exercise prescription modification, if appropriate. Monthly reports of weight and exercise heart rate and any laboratory results are forwarded to personal physicians. Usually within six months a patient may advance from the pool phase to a track phase where he begins a jog/walk exercise session. Progress of this sort is based on the decisions of the patient, his or her physician, and the program staff. During track sessions, patients begin with warm up exercises and then alternate between jogging and walking. Following this warm up period, individuals perform their distance and duration prescriptions, periodically monitoring their own pulses. Bicycle ergometers are available. The interest level is commonly maintained through group activity, such as volleyball, prior to the cool down exercises.

Most patients demonstrate increases in exercise tolerance, as measured by periodic tests for functional capacity. The advanced track phase may become an indefinite, maintenance program for these patients. Further development in cardiac rehabilitation occurs for some people who, upon demonstrated performance and the advice of their personal physicians, may enter

community fitness programs or continue with their own exercise regimens. Personal satisfaction and improvement has been expressed by nearly everyone.

ADULT FITNESS

This year an Adult Fitness Program was established for residents of the LaCrosse area to improve physical and mental fitness. The program provides an organized exercise session three mornings a week. A physician's referral is necessary for entry into this program designed for healthy adults. Mandatory laboratory evaluations include ECG, GXT, functional capacity, strength and flexibility, orthopedic evaluation, blood analysis, and nutritional status. Given personal exercise prescriptions, the adults warm up under the direction of exercise leaders. Each morning, groups are formed which jog from one to six miles under the exercise leaders' and technicians' supervision. Running may take place either indoors or outside on pre-mapped running trails. The program also offers health education through behavior modification and counseling. Upon completing the first six months of the program, and annually thereafter, the participants are given functional assessments. Each annual GXT and laboratory evaluation gives information on their level of physical fitness, and warns of any changes. Group members frequently report an increased sense of well-being in all their daily activities. Such a progressive health plan is an obvious asset to the community.

CONCLUSION

Attending the workshop provided representatives of several disciplines a chance to exchange technical skills and experiences. When I attended the workshop in July, 1977, I was joined there by nurses and ECG technicians, YMCA and clinical program directors, cardiovascular and pulmonary techs, physical therapists and athletes, research and industry representatives, college professors and students. All were drawn to LaCrosse by the goal of obtaining personal expertise as a Cardiac Exercise Technician.

Workshops such as the one at LaCrosse are an important means of promoting a uniform approach to exercise technology. With the expansion of knowledge and the rapid development of this specialized field, it is becoming increasingly advantageous for Exercise Technicians to provide evidence of their competence through certification. Acceptance of an unprejudiced, interdisciplinary criterion ensures the education and credentials essential for the establishment of areas of responsibility and practice. As with other health and professional fields, acquisition of the credentials makes possible a teamwork approach to the goal of therapeutic and preventive health programs for all members of society. If Exercise Technicians are to demonstrate their concern for the protection of both patients and exercising adults, they must then be interested in the effectiveness and professionalism of these programs.

REFERENCES

1. Laren, D.A. and R.D. Malmberg, (eds.), Coronary Heart Disease and Physical Fitness, Baltimore, University Park Press, 1971
2. Cronin, E.P., "Jogging and Cardiovascular Health", CVP. Journal of Cardiovascular and Pulmonary Technology, Vol. 5, No. 2, 1977, p.21
3. Hellerstein, H.K., "Exercise Tests Inadequate for Cardiac Patients", The Physician and Sportsmedicine, August 1976 p. 58
4. Kellerman, J.J., "Rehabilitation of Patients with Coronary Heart Disease", Progress in Cardiovascular Diseases, Vol. 17, No. 4, p. 303
5. Naughton, J.P. and H.K. Hellerstein, (eds.), Exercise Testing and Exercise Testing in Coronary Heart Disease, New York, Academic Press, 1973
6. Ellestad, M.H., Stress Testing, Philadelphia, F.A. Davis, 1975
7. Wilson, P.K., (ed.), Adult Fitness and Cardiac Rehabilitation, Baltimore, University Press, 1975
8. The Committee on Exercise, Exercise Testing and Training of Apparently Healthy Individuals: A Handbook for Physicians, American Heart Association, 1972
9. The Committee on Exercise, Exercise Testing and Training of Individuals with Heart Disease or at High Risk for Its Development: A Handbook for Physicians, American Heart Association, 1975
10. American College of Sports Medicine, Guidelines for Graded Exercise Testing and Exercise Prescription, Philadelphia, Lea and Febiger, 1976
11. Fox, S.M. (ed.), Coronary Heart Disease: Prevention, Detection, Rehabilitation with Emphasis on Exercise Testing, Denver, International Medical Corp., 1974
12. Kidd, P., "Taking the Stress Out of Stress Testing", CVP Journal of Cardiovascular and Pulmonary Technology, Vol. 5, No. 3, 1977, p. 15

ACKNOWLEDGEMENTS

The author wishes to thank Ms. Gertrude M. Miller and Ms. Virginia E. Reed for their valuable assistance in the preparation and the editing of the manuscript. Appreciation is extended to participants and members of the La Crosse Exercise Program and its Executive Director, Philip K. Wilson, Ed.D., School of Health, Physical Education, and Recreation, University of Wisconsin-La Crosse. La Crosse, Wisconsin for their co-operation.

"The views of the author do not purport
to reflect the positions of the Department of
the Army or the Department of Defense."

Figure 1

The structure of the LaCrosse Program.

LA CROSSE EXERCISE PROGRAM
University of Wisconsin-La Crosse and La Crosse Medical Profession

UNIVERSITY ADMINISTRATION

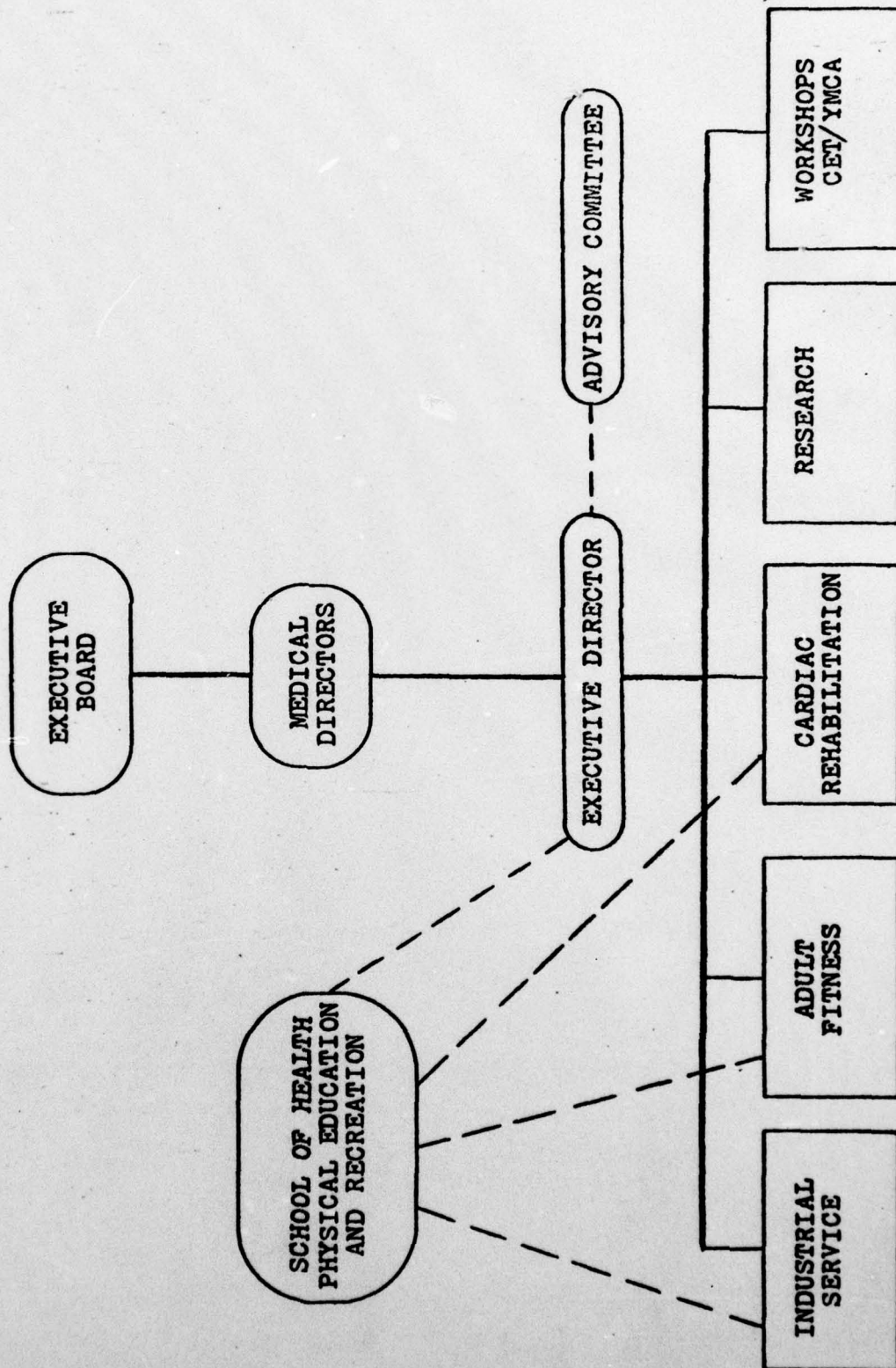


Figure 2

A hypothetical structure for a clinical program of rehabilitation and exercise.

HOSPITAL ADMINISTRATION

MEDICAL DEPARTMENT

CHIEF OF STAFF

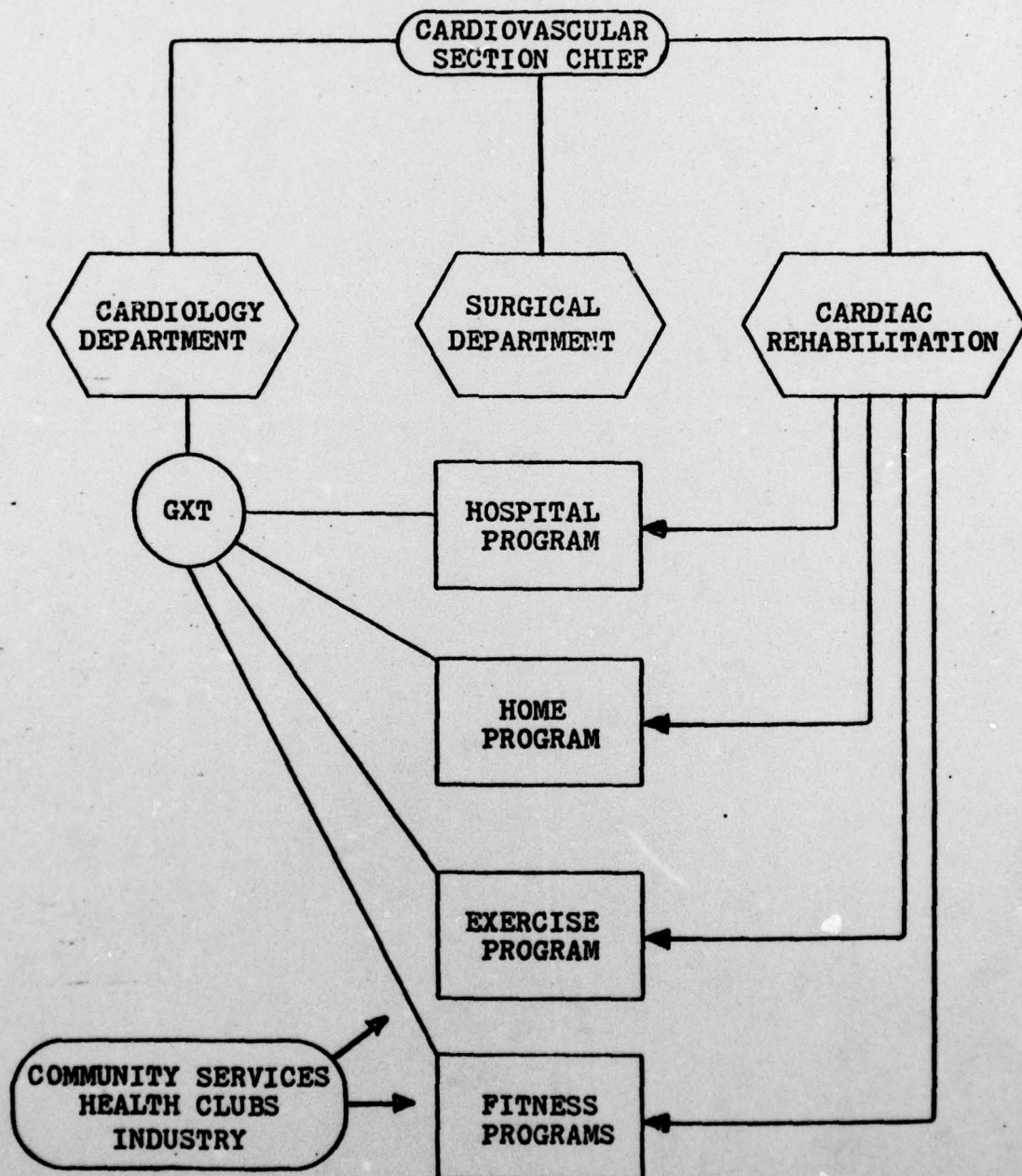


Figure 3

Workshop participants performed Graded Exercise Testing procedures such as recording of blood pressure, setting of timing and treadmill modes, and operating the electrograph. Ten different stress testing stations were available at the Human Performance Laboratory

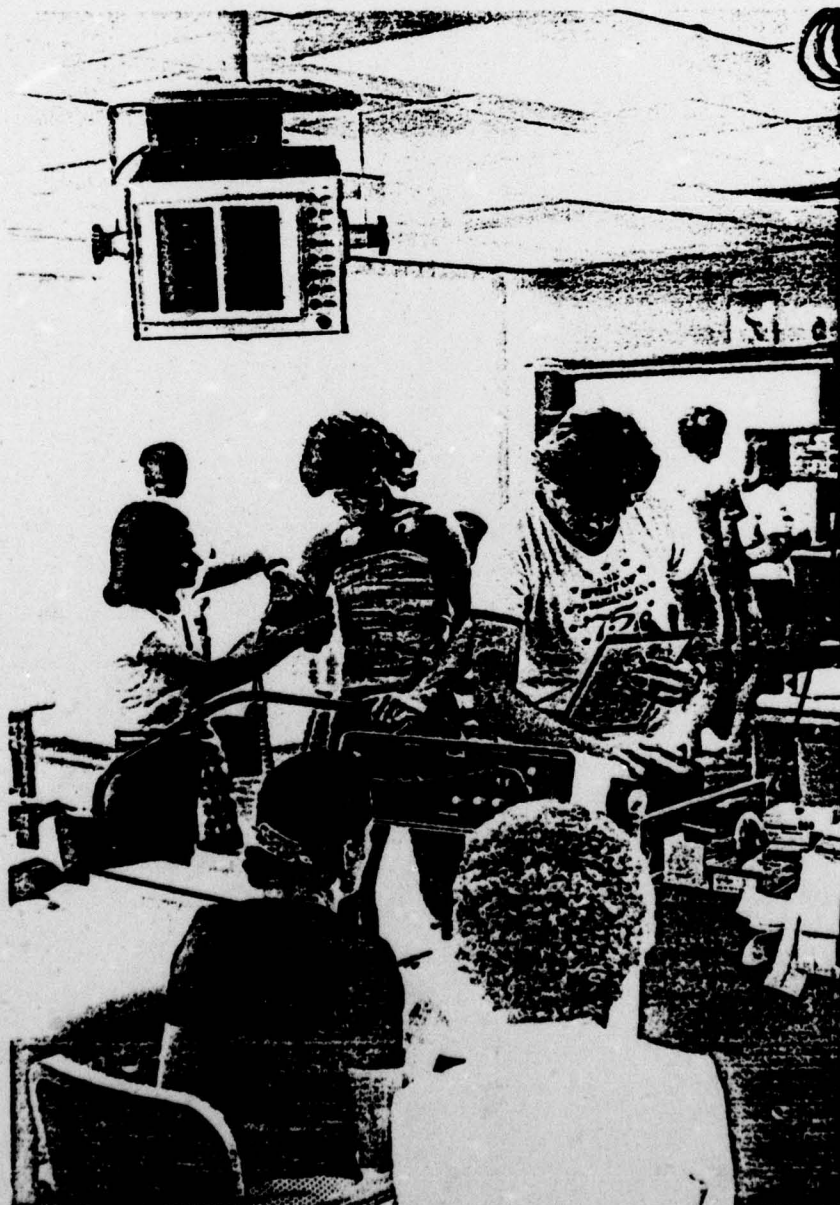


Figure 4

In the laboratory practical examination each participant was observed by staff personnel during GXT exercises for proper skills and techniques.



Figure 5

A total approach to Cardiovascular Health involves a multi-phase program of therapeutic and conditioning exercises for community members with varying medical conditions and interests.

PHASE	MEDICAL CONDITIONS	EVALUATIONS
I: Inpatient Rehabilitation and Recovery	Post Myocardial Infarction Post Operative Documented Cardiac Patient	Discharge GXT Ambulatory Monitor Exercise Prescription
II: Outpatient Rehabilitation and Convalescence	High Risk Factors Documented Cardiac Patients	Maximal GXT Exercise Prescription
III: Exercise Rehabilitation and Intervention	At Slight Risk or Prone to CHD Stable Cardiac Patients	Periodic GXT Exercise Prescription
IV: Prevention and Maintenance	General Population Former Cardiac Patients	Functional GXT Physical Fitness Assessment

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER M 1/78	2. GOVT ACCESSION NO. USARTEM-M-1/78	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) The Cardiac Exercise Technician - a LaCrosse Workshop		5. TYPE OF REPORT & PERIOD COVERED
7. AUTHOR Omar D. Hottenstein		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Research Institute of Environmental Medicine, Natick, MA 01760		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS US Army Medical Research & Development Command Washington, DC 20314		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Same		12. REPORT DATE 29 September 1977
		13. NUMBER OF PAGES 34 p.
		15. SECURITY CLASS (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Distribution of this document is unlimited.		
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> DISTRIBUTION STATEMENT A Approved for public release; Distribution Unlimited </div>		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) NA		
18. SUPPLEMENTARY NOTES NA		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) cardiac exercise technician, stress testing, fitness program		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) In recent years, the rate of expansion in the field of exercise evaluation and physical fitness training has prompted governmental, professional, educational, and private institutions to develop educational programs, professional standards, and cooperation among the various disciplines involved in stress testing, cardiac rehabilitation, and adult fitness. Cardiac Exercise Technicians have become important personnel in many aspects of preventive, rehabilitative and maintenance fitness programs. Beyond their		

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

040850

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

normal responsibilities and roles during graded exercise test administration, they may also serve as efficient, competent assistants for exercise sessions and emergency procedures.

This article is a presentation of the background organization, and a description of one such educational program: the Cardiac Exercise Technician Workshop of the LaCrosse Exercise Program, University of Wisconsin-LaCrosse. Included are considerations of specific interest to exercise technicians and those involved in graded exercise testing and training.

EXHIBITION EXHIBIT A
Approved for public release
Distribution Unlimited

UNCLASSIFIED